Serbian Ceramic Society Conference
ADVANCED CERAMICS AND APPLICATION XI
New Frontiers in Multifunctional Material Science and Processing

Serbian Ceramic Society
Institute of Technical Sciences of SASA
Institute for Testing of Materials
Institute of Chemistry Technology and Metallurgy
Institute for Technology of Nuclear and Other Raw Mineral Materials

PROGRAM AND THE BOOK OF ABSTRACTS

Serbian Academy of Sciences and Arts, Knez Mihailova 35
Serbia, Belgrade, 18-20. September 2023.

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Dear colleagues and friends,

We have great pleasure to welcome you to the Advanced Ceramic and Application XI Conference organized by the Serbian Ceramic Society in cooperation with the Institute of Technical Sciences of SASA, Institute of Chemistry Technology and Metallurgy, Institute for Technology of Nuclear and Other Raw Mineral Materials and Institute for Testing of Materials.

It is nice to host you here in Belgrade in person. We are very proud that we succeeded in bringing the scientific community together again and fostering the networking and social interactions around an interesting program on emerging advanced ceramic topics. The chosen topics cover contributions from fundamental theoretical research in advanced ceramics, computer-aided design and modeling of new ceramics products, manufacturing of nano-ceramic devices, developing of multifunctional ceramic processing routes, etc.

Traditionally, ACA Conferences gather leading researchers, engineers, specialists, professors and PhD students trying to emphasize the key achievements which will enable the widespread use of the advanced ceramics products in the High-Tech industry, renewable energy utilization, environmental efficiency, security, space technology, cultural heritage, etc.

Serbian Ceramic Society was initiated in 1995/1996 and fully registered in 1997 as Yugoslav Ceramic Society, being strongly supported by American Ceramic Society. Since 2009, it has continued as the Serbian Ceramic Society in accordance with Serbian law procedure. Serbian Ceramic Society is almost the only one Ceramic Society in South-East Europe, with members from more than 20 Institutes and Universities, active in 9 sessions..

Dr. Nina Obradović
President of the Serbian Ceramic Society

Dr. Suzana Filipović
President of the General Assembly of the Serbian Ceramic Society

Conference Topics

- Basic Ceramic Science & Sintering
- Nano-, Opto- & Bio-ceramics
- Modeling & Simulation
- Glass and Electro Ceramics
- Electrochemistry & Catalysis
- Refractory, Cements & Clays
- Renewable Energy & Composites
- Amorphous & Magnetic Ceramics
- Heritage, Art & Design

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Institut za tehnologiju nuklearnih i drugih mineralnih sirovina

ORL4

Influence of Fe Doping on the Crystal Structure and Optical Properties of Mechanically Activated $SrTiO_3$Powders

J. Živojinović[1], A. Peleš Tadić[1], D. Kosanović[1,5], N. Tadić[2], Z. Vasiljević[3], S. M. Lević[4], N. Obradović[1]

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Iron-doped strontium-titanate ($SrTiO_3$) powders with various iron(III) oxide (Fe_2O_3) weight percentages (1.5, 3 and 6 wt%) were prepared by a solid-state method in the presence of mechanical activation (10, 30 and 120 min). A systematic investigation by XRD, SEM and Raman spectroscopy has been undertaken to evaluate the role of dopant on the microstructural and morphological study of the perovskite oxideobtained. The optical properties of the different iron-doped and activated Fe-$SrTiO_3$ powders have been also evaluated. The results demonstrated that Fe has been substituted into the lattice and surface layers of particles of $SrTiO_3$ powders and the absorption edge shifted to higher wavelength values with increasing activation time and dopant weight percentage. The lowest value of the band gap (E_g=3.20 eV) was registered for the longest activation (120 min) and the highest weight percentage of dopant (6 wt%). Combining doping with mechanical activation, led to lower values of Eg and that fact could be used in subsequent studies to make Fe-$SrTiO_3$ more suitable photocatalysts.

ORL5

Detection of bisphenol S via screen-printed electrodes

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Screen-printed electrodes are economical, easy-to-use electrochemical sensors that can be used for *in-situ* real-time monitoring of toxic substances. This work represents a comparison of two SPEs electrodes for the detection of bisphenol S (BPS). BPS is an endocrine-

interrupts the hormonal system in humans and shows a genotoxic, cytotoxic and cancer-promoting effect. Fast and reliable detection of bisphenols is very important. Chromatographic and spectroscopic techniques are the most used methods for the detection of bisphenols, however they are expensive, complicated and consume a lot of time. On the other hand, electrochemical sensors are promising since they are fast, reliable and simple methods for in-situ measuring. In the present work the detection of BPS was performed via screen-printed electrodes with carbon nanoparticles and carbon single-wall nanotube working electrodes. Determination of BPS was carried out by cyclic voltammetry (CV) and differential puls voltammetry (DPV). The influence of different concentrations of BPS, scan rate and influencing BPA on detection were studied. Screen-printed electrodes showed very good electrochemical activity, sensitivity and repeatability. Screen-printed electrodes enable the miniaturization of sensors elements, using smaller volumes of samples, rapid and low cost detection without generating dangerus waste.

ORL6

Structural characteristics of $MgAl_2O_4$ spinel

A.Peleš Tadić[1], J. Živojinović[1], N. Tadić[2], S. M. Lević[3], S. Marković[1], V. Pavlović[3], S. Filipović[1], N. Obradović[1]

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Magnesium aluminate spinel ($MgAl_2O_4$) is a material with good mechanical, chemical, and thermal properties, low dielectric permeability and loss tangent. Based on those properties, $MgAl_2O_4$has found a significant application in refractory ceramics, ceramics windows, integrated electronic devices, etc. Also, it possesses a high chemical and radiation resistance. In this research, MgO was calcined at 1000^{o}C for an hour, with a step of 10^{o}C/min to avoid presence of hydroxide or carbonate. MgO and Al_2O_3 powders were mixed in a one-to-one molar ratio afterwards. The powders were mechanically activated for 15, 30, and 60 minutes. The mass ratio of powder and balls was 1:40. The mechanically activated powders are pressed in the tablets, under the pressure of 0.5 t. The pressed powders were heated up to 1300 ^{o}C with a step of 10 ^{o}C/min and held for 1 h for the reaction. Reacted pellets were crushed and sieved. Obtained spinel powders were sintered at 1450 ^{o}C for 2 h. Both sintered and non-sintered samples were investigated by XRD and SEM. The particle size distribution of the reacted powders was investigated bylaser diffraction analysis. Raman spectroscopy was used to determine the lattice vibration in the sintered samples. All results are in accordance with our previous results, and the pure dense spinel phase is obtained.